SEQUENCE LISTING

Meloen, Robert Hans Oonk, Hendrica Berendina

<120> An Improved Peptide, Immunogenic Composition and Vaccine or Medical Preparation, a Method to Immunise Animals Against the Hormone LHRH, and Analogs of the LHRH Tandem Repeat Peptide and their Use as Vaccine

- <130> 2\183-4518US
- <140> 09/659,983
- <141> 2000,09-12
- <150> US 09/274,048
- <151> 1999-03\22
- <150> US 08/98 \ 557
- <151> 1995-06-07
- <150> PCT/NL96/00223
- <151> 1996-06-06
- <150> US 08/447,298
- <151> 1995-06-07
- <150> US 08/476,013
- <151> 1995-06-07
- <160> 13
- <170> PatentIn version 3.0
- <210> 1
- <211> 10
- <212> PRT
- <213> Sus scrofa
- <220>
- <221> PEPTIDE
- <222> (1)..(1)
- <223> X=pyroglutamic acid
- <220>
- <221> PEPTIDE
- <222> (10)..(10)
- <223> X=Gly-NH2

```
<400> 1
Xaa His Trp Ser Tyr Gly Leu Arg Pro Xaa
<210> \2
<211>10
<212> PR 木
<213> Homo sapiens
<220>
<221> PEPTIDE
<222> (1)..(1)
<223> X=pyroglutamic\acid
<220>
<221> PEPTIDE
<222> (10)..(10)
<223> X=Gly-NH2
<400> 2
Xaa His Trp Ser His Gly Trp Tyr Pro Xaa
                      10
1
         5
<210> 3
<211> 20
<212> PRT
<213> artificial
<220>
<223> A peptide suitable for eliciting an immune response against forms
     GnRH/ LHRH
<220>
<221> PEPTIDE
<222> (1)..(1)
<223> X=pyroglutamic acid or Gln with attached tail of one or more addi,
```

tional amino acid

```
<220>
<221> PEPTIDE
<222> (3)..(3)
<223> X=Trp or N(indole)formyl-tryptophan
<220>
<221> PERTIDE
<222> (11)..((1)
<223> X=direct bond or a spacer group between Gly at position 10 and Gl
    n at position 1
<220>
<221> PEPTIDE
<222> (13)..(13)
<223> X=Trp or N(indole)formyl-tryptophan
<220>
<221> PEPTIDE
<222> (20)..(20)
<223> X=Gly-NH2 or Gly with attached tail of one or more amino acids
<220>
<221> VARIANT
<222> (10)..(20)
<223> variable repeat sequence <>10-20
<400> 3
Xaa His Xaa Ser Tyr Gly Leu Arg Pro Gly Xaa His Xaa Ser Tyr Gly
                      10
                                   15
1
          5
Leu Arg Pro Xaa
       20
<210> 4
<211> 21
<212> PRT
<213> artificial
<220>
```

<223> A peptide suitable for eliciting an immune response against forms

GnRH/ LHRH

```
<220>
<221> PEPTIDE
€222> (1)..(1)
<223> X=pyroglutamic acid
<220>
<221> PEPTIDE
<222> (6).(6)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (11)..(11)
<223> X=Gly or Gly preceded by a spacer
<220>
<221> PEPTIDE
<222> (16)..(16)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (21)..(21)
<223> X=Cys-NH2
<400> 4
Xaa His Thr Ser Tyr Xaa Leu Arg Pro Gly Xaa His Thr Ser Tyr Xaa
         5
                     10
                                  15
Leu Arg Pro Gly Xaa
      20
<210> 5
<211> 21
<212> PRT
<213> artificial
<220>
<223> A peptide suitable for eliciting an immune response against forms
```

GnRH/ LHRH

<220>

```
<221> PEPTIDE
<222> (1)..(1)
<223> X=pyroglutamic acid
<2\20>
<22\> PEPTIDE
<2223 (4)..(4)
<223> X=amino acid substitution
<220>
<221> PEP'XIDE
<222> (6)..(6)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (11)..(11)
<223> X=Gly or Gly preceded by a spacer
<220>
<221> PEPTIDE
<222> (14)..(14)
<223> X=amino acid substitution
<220>
<221> PEPTIDE
<222> (16)..(16)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (21)..(21)
<223> X=Cys-NH2
<400> 5
Xaa His Thr Xaa Tyr Xaa Leu Ala Pro Gly Xaa His Thr Xaa Tyr Xaa
                                 15
Leu Arg Pro Gly Xaa
      20
```

<210> 6 <211> 21 <212> PRT

```
<213> artificial
 <220>
23> A peptide suitable for eliciting an immune response against forms
    GnRH/ LHRH
<220>
<221> REPTIDE
<222> (1)\(.(1)
<223> X=pyroglutamic acid
<220>
<221> PEPTIDE
<222> (6)..(6)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (8)..(8)
<223> X=amino acid substitution
<220>
<221> PEPTIDE
<222> (11)..(11)
<223> X=Gly or Gly preceded by a spacer
<220>
<221> PEPTIDE
<222> (16)..(16)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (18)..(18)
<223> X=amino acid substitution
<220>
<221> PEPTIDE
<222> (21)..(21)
<223> X=Cys-NH2
<400> 6
```

Xaa His Thr Ser Tyr Xaa Leu Xaa Pro Gly Xaa His Thr Ser Tyr Xaa 5 10

Leu Xaa Pro Gly Xaa 20

```
<210> 7
           <211> 21
اعتهي
           <212> PRT
            <213> artificial
           <223 A peptide suitable for eliciting an immune response against forms
                GoRH/ LHRH
           <220>
           <221> PEP NDE
           <222> (1)..(1)
           <223> X=pyroglutamic acid
           <220>
           <221> PEPTIDE
           <222> (6)..(6)
           <223> X=D-Lys
           <220>
           <221> PEPTIDE
           <222> (10)..(10)
           <223> X=amino acid substutition
           <220>
           <221> PEPTIDE
           <222> (11)..(11)
           <223> X=Gly or Gly preceded by a spacer
           <220>
           <221> PEPTIDE
           <222> (16)..(16)
           <223> X=amino acid substitution
           <220>
           <221> PEPTIDE
           <222> (20)..(20)
           <223> X=amino acid substitution
```

<220>

<221> PEPTIDE <222> (21)..(21) <223> X=Cys-NH2

```
<400> 7
Xaa His Thr Ser Tyr Xaa Leu Arg Pro Xaa Xaa His Thr Ser Tyr Xaa
Leu Arg Pro Xaa Xaa
      20
<210> 8
<211> 42
<212> PRT
<213> artificial
<220>
<223> A peptide suitable for eliciting an immune response against forms
     GnRH/ LHRH
<220>
<221> PEPTIDE
<222> (1)..(1)
<223> X=Glu-NH2
<220>
<221> PEPTIDE
<222> (6)..(6)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (11)..(11)
<223> X=Gly or Gly preceded by a spacer
<220>
<221> PEPTIDE
<222> (16)..(16)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (22)..(22)
```

<223> X=Glu-NH2

<220>

```
<221> PEPTIDE
$\bar{222} (27)..(27)
<2\p23> X=D-Lys
<2203
<221>\PEPTIDE
<222> (§2)..(32)
<223> X=Gly or Gly preceded by a spacer
<220>
<221> PEPTIDE
<222> (37)..(37)
<223> X=D-Lys
<220>
<221> SITE
<222> (21)..(42)
<223> dimer formed between Cys 21 and Cys 42
<400> 8
Xaa His Thr Ser Thr Xaa Leu Arg Pro Gly Xaa His Thr Ser Tyr Xaa
          5
                      10
Leu Arg Pro Gly Cys Xaa His Thr Ser Tyr Xaa Leu Arg Pro Gly Xaa
       20
                   25
                                30
His Thr Ser Tyr Xaa Leu Arg Pro Gly Cys
    35
                 40
<210> 9
<211> 21
<212> PRT
<213> artificial
<220>
<223> A peptide suitable for eliciting an immune response against forms
     GnRH/ LHRH
```

<220>

<221> PEPTIDE <222> (1)..(1)

```
RUL E)
            <223> X=pyroglutamic acid
            <220>
            <221> PEPTIDE
            <222> (6).\(6)
            <223> X=D-Lys
            <220>
            <221> PEPTIDE
            <222> (11)..(11)
            <223> X=Gly or Gly preceded by a spacer
            <220>
            <221> PEPTIDE
            <222> (16)..(16)
            <223> X=D-Lys
            <220>
            <221> PEPTIDE
            <222> (21)..(21)
            <223> X=Cys-NH2
            <400> 9
            Xaa His Thr Ser Tyr Xaa Leu Arg Pro Gly Xaa His Thr Ser Tyr Xaa
                     5
                                 10
                                              15
            1
            Leu Ala Pro Gly Xaa
                   20
            <210> 10
            <211> 21
            <212> PRT
            <213> artificial
            <220>
            <223> A peptide suitable for eliciting an immune response against forms
                 GnRH/ LHRH
            <220>
            <221> PEPTIDE
```

<222> (1)..(1)

```
<223> X=amino acid substitution with acetyl group
<\220>
<221> PEPTIDE
<222> (6)..(6)
<223≯ X=D-Lys
<220>
<221> PERTIDE
<222> (11).\(11)
<223> X=amino acid substitution
<220>
<221> PEPTIDE
<222> (16)..(16)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (21)..(21)
<223> X=Cys-NH2
<400> 10
Xaa His Thr Ser Tyr Ser Leu Arg Pro Gly Xaa His Thr Ser Tyr Ser
          5
                     10
Leu Arg Pro Gly Xaa
       20
<210> 11
<211> 21
<212> PRT
<213> artificial
<220>
<223> A peptide suitable for eliciting an immune response against forms
     GnRH/ LHRH
<220>
<221> PEPTIDE
<222> (1)..(1)
```

<223> X=pyroglutamic acid

```
<2200>
<221> PEPTIDE
<222>\(5)..(5)
<223> X=amino acid substitution
<220>
<221> PERTIDE
<222> (6)..(6)
<223> X=D\Lys
<220>
<221> PEPTIDE
<222> (11)..(11)
<223> X=Gly or Gly preceded by a spacer
<220>
<221> PEPTIDE
<222> (15)..(15)
<223> X=amino acid substitution
<220>
<221> PEPTIDE
<222> (16)..(16)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (21)..(21)
<223> X=Cys-NH2
<400> 11
Xaa His Thr Ser Xaa Xaa Leu Arg Pro Gly Xaa His Thr Ser Xaa Xaa
         5
                     10
                                  15
Leu Arg Pro Gly Xaa
      20
<210> 12
<211> 21
<212> PRT
<213> artificial
<220>
<223> A peptide suitable for eliciting an immune response against forms
```

GnRH/ LHRH

```
₹20>
<221> PEPTIDE
<222> (1)..(1)
<223≯ X=pyroglutamic acid
<220>
<221> PEPTIDE
<222> (6)..(6)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (7)..(7)
<223> X=amino acid substitution
<220>
<221> PEPTIDE
<222> (11)..(11)
<223> X=Gly or Gly preceded by a spacer
<220>
<221> PEPTIDE
<222> (16)..(16)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (17)..(17)
<223> X=amino acid substitution
<220>
<221> PEPTIDE
<222> (21)..(21)
<223> X=Cys-NH2
<400> 12
Xaa His Thr Ser Tyr Xaa Xaa Arg Pro Gly Xaa His Thr Ser Tyr Xaa
```

10

Xaa Arg Pro Gly Xaa 20

```
<210> 13
<\211> 21
<2\2> PRT
<213> artificial
<220>
<223> A peptide suitable for eliciting an immune response against forms
     GnRH/ LHRH
<220>
<221> PEPT\UDE
<222> (1)..(1)\
<223> X=pyroglutamic acid
<220>
<221> PEPTIDE
<222> (6)..(6)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (9)..(9)
<223> X=amino acid substitution
<220>
<221> PEPTIDE
<222> (11)..(11)
<223> X=Gly or Gly preceded by a spacer
<220>
<221> PEPTIDE
<222> (16)..(16)
<223> X=D-Lys
<220>
<221> PEPTIDE
<222> (21)..(21)
<223> X=Cys-NH2
<400> 13
Xaa His Thr Ser Tyr Xaa Leu Arg Xaa Gly Xaa His Thr Ser Tyr Xaa
```

Leu Arg Xaa Gly Xaa 20